enables the standby management blade to take over operations previously performed by the active management blade, thus becoming a new active management blade.

a2 cont'd. 24 31. The system of claim 23 30, wherein the system is further configured to annunciate a status indicator on the management blade that is initially the active management blade in response to detection that that blade has failed.--

REMARKS

This Amendment is in response to the Office Action dated March 27, 2002. In the Office Action, the Examiner rejected claim 1 under 35 U.S.C. § 102(e) as being anticipated by Lin et al., U.S. Patent No. 6,310,410 (hereinafter *Lin*). Claims 2-24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Lin* in view of Takata et al., U.S. Patent No. 5,796,185 (hereinafter *Takata*).

Claims 1, 4, and 13 are amended as shown above. Specifically, independent claim 1 is amended to more clearly recite features of the claimed invention. Claim 4 has been amended to recite elements corresponding to amended claim 1. Independent claim 13 and dependent claim 24 have been amended to correct previous inadvertent errors. Claims 2, 3, 7-10, and 12 are canceled herein without prejudice. New claims 25-31 have been added. Claims 1, 4-6, 11, and 13-31 are now pending in the application. For the reasons set forth below, the Applicants respectfully request reconsideration and allowance of all pending claims.

Argument in Support of Allowance of Amended Claim 1

Claim 1 has been amended to substantially claim the subject matter of claim 4, as originally filed, which depended from originally-filed claims 1, 2, and 3. The Examiner rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over *Lin* in view of *Takata*. Applicants respectfully assert that the rejection of originally filed claim 4

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was improper, and that amended claim 1 is patentable over the combination of the *Lin* and *Takata* references, as argued below.

To establish a *prima facie* case of obviousness, there must first be some suggestion or motivation to modify a reference or to combine references, and second, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. M.P.E.P. § 706.02(j) from *In Re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed device; and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the Applicants' disclosure. *Amgen v. Chugai Pharmaceutical*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991), *Fritsch v. Lin*, 21 USPQ2d 1731 (Bd. Pat. App. & Int'f 1991). An invention is non-obvious if the references fail not only to expressly disclose the claimed invention as a whole, but also to suggest to one of ordinary skill in the art modifications needed to meet all the claim limitations. *Litton Industrial Products, Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 164, 225 USPQ 34, 38 (Fed. Cir. 1985).

The Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to be obvious in light of the teachings of the references. M.P.E.P. § 70602(j) from *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Obviousness cannot be established by combining references without also providing evidence of the motivating force that would impel one skilled in the art to do what the patent applicant has done. M.P.E.P. § 2144 from *Ex parte*

Levengood, 28 USPQ2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) (emphasis added by M.P.E.P.) Applicant respectfully asserts that none of the prongs of the obviousness test are supported by the cited prior art.

Lin discloses a method and apparatus for reducing source voltage deviations in hot plug applications. In one embodiment shown in FIG. 3, Lin discloses an apparatus for reducing source voltage deviations that is enabled through the use of two power output sockets (72 and 74) having different depths, and a resistor 76, all comprising components in a base system 12. During coupling an auxiliary system 14 to the base system, connections are initially made between socket 72 and pin 80, along with a socket 24 and pin 28 (see FIG. 1). Connected between this path are a power supply 16 and resistor 76. As power flows across resistor 76, transient voltages that might normally occur without the resistor are reduced.

As stated in the abstract, *Takata* discloses "a system on an aircraft that ***eliminates*** hot-swapping of circuit boards to prevent damage to the circuit board connector interfaces." (Emphasis added.) As stated in the Summary of the Invention, "The present invention overcomes the limitations imposed on airborne systems by providing a system that ***inhibits*** hot-card swapping and meets airborne electromagnetic and heat generation requirements." (Emphasis added.) The system employs power control circuit that includes a logic circuit to enable a main power supply that provides power to circuit cards in the system based on card present signals. As further stated in the last paragraph of the Summary of the Invention,

> The logic circuit in the power control circuit combines the information from the card present signal with other card present signals from other ***necessary*** circuit cards, cards ***without which the system cannot operate***. . . . ***The power control circuit enables operation of the main power supply such that the power supply provides power only when all circuit cards necessary to the proper operation of the system are already connected. In particular, the control circuit disconnects or disables the main power supply if a necessary circuit card is removed or if a bad connection is detected in a coupling***

between the power control circuit and a necessary circuit card. (Col. 2, line 65 – Col. 3, line12.) (Emphasis added)

A disclosed embodiment of the invention will now be discussed in comparison to the applied reference(s). Of course, the discussion of the disclosed embodiment, and the discussion of the differences between the disclosed embodiment and the subject matter described in the applied reference(s), do not define the scope or interpretation of any of the claims. Instead, such discussed differences are intended to merely help the Examiner appreciate important claim distinctions discussed thereafter.

The present invention concerns a power management strategy to support hot swapping of system blades during run-time. In many implementations, it is necessary to provide 24/7 uptime for servers. This is facilitated by providing a server architecture that supports "hot-swappable" components, that is an architecture that supports replacement of serviceable components without taking the server down. In many servers, these components typically include hot-swap drives and hot-swap power supplies. However, prior art servers do not support replacement of CPU blades and/or similar blades that provide system management operations.

The present invention facilitates hot-swapping of system blades, in part, through the use of a connector that includes pins or sockets of three different lengths, wherein medium-length pins/sockets are used for data signals. The longest pins are used for an initial power input, with one or more of the shortest pins used for continuous power input. Other short pins may be used for providing status information (power good and health status) and a card presence signal. Another short pin is used to receive an enable signal that is used to enable operation of a power supply (e.g., DC-to-DC converter) provided on each blade. Some of these pins are illustrated in FIG. 5, while others are implied through references in the flow diagrams of FIGs. 2A, 2B, 3 and 4 and the architecture diagram of FIG. 1. The use of the different-length pins/sockets and control logic providing by various system blades enable system blades to be removed

or added in a planned matter, or removed via a forced extraction, without taking the system down. The system also provides a failure detection process and recovering therefrom.

Amended claim 1 recites an embodiment that clearly recites elements that are not taught or suggested by the cited prior art references, either alone or in combination:

1. (Amended) A hot swappable blade comprising:

an enableable power supply having enable and power input terminals and a power output terminal, to provide power to circuitry on the blade connected to the power output terminal in response to receiving an enable signal on the enable terminal;

a connector having first, second and third pin/sockets, the first pin/socket being longer than the second and third pin/sockets;

the first and second pins/sockets being operatively coupled to the power input terminal of the enableable power supply and the third pin/socket operatively coupled to the enable terminal of the enableable power supply; and

an impedance element connected between the first pin/socket and the power input terminal.

Notably, this claim pertains to a hot-swappable blade and components related thereto. In rejecting each of claims 2-12 and 15-19, the Examiner asserts that, "TAKATA discloses a power converter module (column 6, line 18) and an enabling function to enable the power signal (column 6, line 44)." The Examiner further states that it would have been obvious to one having ordinary skill in the art at the time of the present invention to disable the power converter during hot swapping and to enable he converter when the blade is sensed, by pins/sockets, to be inserted properly, to protect the circuits on the blade.

As recited in the amended claim 1, the blade includes an enableable power supply including an enable terminal that is used to enable the power supply to supply power to circuitry on the blade. The blade further includes a connector having a third

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(enable) pin/socket that is operatively coupled to the enable terminal. *Takata* does not have any power supplies on his first and second circuit cards, but rather uses a single enableable power supply that provides or does not provide power to all circuit cards in the *Takata* system. Furthermore, *Takata* does not teach or suggest the use of an enable pin/socket on the connector of the circuit cards, as there would be no need for such a pin.

Significantly, in accordance with the present invention, each blade provides its own enableable power supply and the system provides control of the power supply via a signal that is received at the enable terminal such that the removal or addition of a blade may be performed without shutting the server down (i.e., during run-time). In stark contrast, *Takata* provides a power circuit that includes logic to disable a single power supply that is used to supply power to all of the circuit cards in his system if an inappropriate configuration, such as removal of a required circuit card, is detected. The purpose of this is to ***prevent*** ("inhibit" or "eliminate") hot-swapping of circuit cards, as stated throughout the *Takata* specification and recited above. This is exactly opposite the primary purpose of the present invention (to enable hot-swapping of blades during run-time). Thus, *Takata* teaches away from the claimed invention of amended claim 1.

Furthermore, there would be no motivation to combine the *Lin* and *Takata* references, or any expectation of success. Clearly, *Takata* teaches a system that is designed to inhibit hot-swapping of circuit cards. In the Background of the Invention, *Takata* also discusses several disadvantages of asymmetric connectors (i.e., connectors with different length pins) used for hot-swapping (Col. 1, lines 48-62). Additionally, Lin does not describe the use of his invention in connection with a multi-pin connector of the type used in *Takata*. There is nothing in either reference that would provide motivation for combining the references, and there would be no expectation of success, especially when considering that the respective inventions are designed for opposite purposes.

In view of the foregoing, Applicants respectfully assert that amended claim 1 is patentable over the prior art. Additionally, each of prior pending claims 4-6, and new pending claims 25-29, which depend either directly or indirectly from claim 1, are in condition for allowance for at least the same reasons. Furthermore, with respect to claims 5 and 6, neither *Takata* nor *Lin* teach or suggest the used of a plurality of pins/sockets for receiving data that have an intermediate length between the first and second pins/sockets.

With respect to new claim 25, neither *Takata* nor *Lin* teach or suggest the use of a reset pin/socket that is used to reset a processor on a blade that includes the processor. With respect to new claim 27, neither *Takata* nor *Lin* teach or suggest the use of a power good pin/socket by which the blade can assert a power good signal. With respect to new claim 28, neither *Takata* nor *Lin* teach or suggest the use of a health pin/socket by which the blade can assert a health signal signifying the health or failure of the blade. With respect to new claim 29, neither *Takata* nor *Lin* teach or suggest the use of an LED by which a blade can indicate a failure status.

Traversal of the Rejection of Claims 13-24

The Examiner rejected claims 13-24 under 35 U.S.C. § 103(a) as being unpatentable over *Lin* in view of *Takata*. Claim 13 has been amended to correct two inadvertent errors – the substance of the claim remains the same as the originally-filed claim. With respect to the rejection of independent claim 13, the Examiner states, "Refer to Takata figure 1." Applicant respectfully asserts that claim 13, as originally-filed and as amended, recites claim elements that are not taught or suggested by Takata. Amended claim 13 recites:

13. (Amended) A system comprising:

a backplane bus;

a plurality of blades each having a connector to engage the backplane bus including two management blades (MBs) and a plurality of other blades (OBs);

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each connector having first pins/sockets of a first length, second pins/sockets of a second length and third pins/sockets of a third length; the first length being the longest length, the third pins/sockets being the shortest length and the second length being longer than the third length and shorter than the first length;

the backplane bus having power lines which cooperatively engage one of the first pins/sockets and one of the third pins/sockets on each of the blades.

First, Takata's system does not teach or suggest the use of management blades. As discussed in the present specification, the management blades provide system management operations, including enabling the power supplies of other blades in the system. Furthermore, as discussed above, neither *Lin* nor *Takata* teach or suggest the use of a connector comprising sockets having three different lengths. Accordingly, the rejection of claim 13 is improper and should be withdrawn. Furthermore, each of originally-filed claims 14-24 and new claims 30 and 31, which depend either directly or indirectly from claim 13, are in condition for allowance for at least the same reasons.

With respect to claim 14, neither *Lin* nor *Takata* teach or suggest the use of second (intermediate-length) pins/sockets for data communications among the blades. With respect to claim 17, neither *Lin* or *Takata* teach or suggest the use of a DC-to-DC converter on a blade that is enabled by an enable signal received over a third pin/socket from the backplane bus. With respect to claim 18, neither *Lin* nor *Takata* teach or suggest that the enable signal originates from one of the management blades. With respect to claim 19, neither *Lin* nor *Takata* teach or suggest providing a signal from an other blade to at least one of the management blades indicating the status of its DC power. With respect to claims 20 and 21, *Takata* teaches away from using the Takata invention for use in a system, such as a server, for which hot-swapping is to be facilitated. With respect to claim 22, neither *Lin* nor *Takata* teach or suggest the use of an additional bus connecting the management blades. With respect to claim 23, neither *Lin* nor *Takata* teach or suggest the use signals to indicate the health of the

management blades that are communicated over the additional bus. Finally, with respect to claim 14, neither *Lin* nor *Takata* teach or suggest a system that employs a plurality of central processing unit blades. Accordingly, the rejection of each of claims 13-24 is improper and should be withdrawn.

In addition, each of new claims 30 and 31 recite subject matter that is not taught or suggested by the prior art. Accordingly, each of these claims is in condition for allowance for at least the same reasons as the claims from which they depend.

Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims 1 and 13. Thus, given the above amendments and accompanying remarks, independent claims 1 and 13 are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: June 11, 2002

R. Alan Burnett
Reg. No. 46,149

MARKED-UP VERSION OF THE AMENDED CLAIMS

1. (Amended) A hot swappable blade comprising:

an enableable power supply having enable and power input terminals and a power output terminal, to provide power to circuitry on the blade connected to the power output terminal in response to receiving an enable signal on the enable terminal;

a connector having [a] first [and a], second and third pin/sockets, the first pin/socket being longer than the second and third pin/sockets;

the first and second pins/sockets being operatively coupled to the power input terminal of the enableable power supply and the third pin/socket operatively coupled to the enable terminal of the enableable power supply [on the blade]; and

[a resistor] an impedance element connected between the first pin/socket and the power input terminal.

4. (Amended) The blade defined by claim [3] 1 wherein the [enable function is controlled by a signal received by the blade on a] third pin/socket [having] is approximately the same length as the second pin socket.

13. (Amended) A system comprising:

a backplane bus;

a plurality of blades each having a connector to engage the backplane bus including two management blades (MBs) and a plurality of other blades (OBs);

each connector having first [length] pins/sockets of a first length, second pins/sockets of a second length and third pins/sockets of a third length; the first length being the longest length, the third pins/sockets being the shortest length and the second length being longer than the third length and shorter than the first length;

the backplane bus having power lines which cooperatively [engages] engage one of the first pins/sockets and one of the third pins/sockets on each of the blades.

24. (Amended) The system defined by claim 23 wherein the OBs include a plurality of central processing unit blades and a plurality of switch blades.